FIG. 1

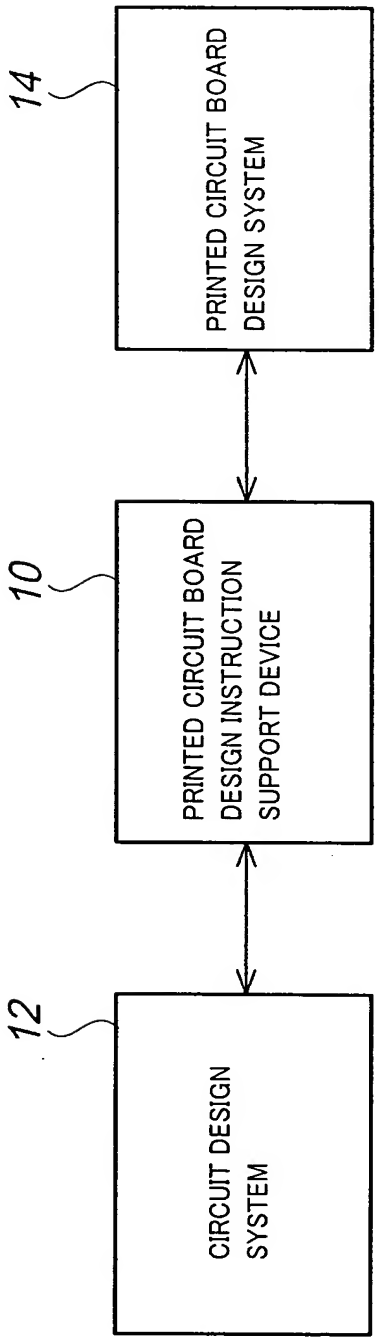

14
PRINTED CIRCUIT BOARD DESIGN SYSTEM
10
PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE
12
CIRCUIT DESIGN SYSTEM

FIG. 2

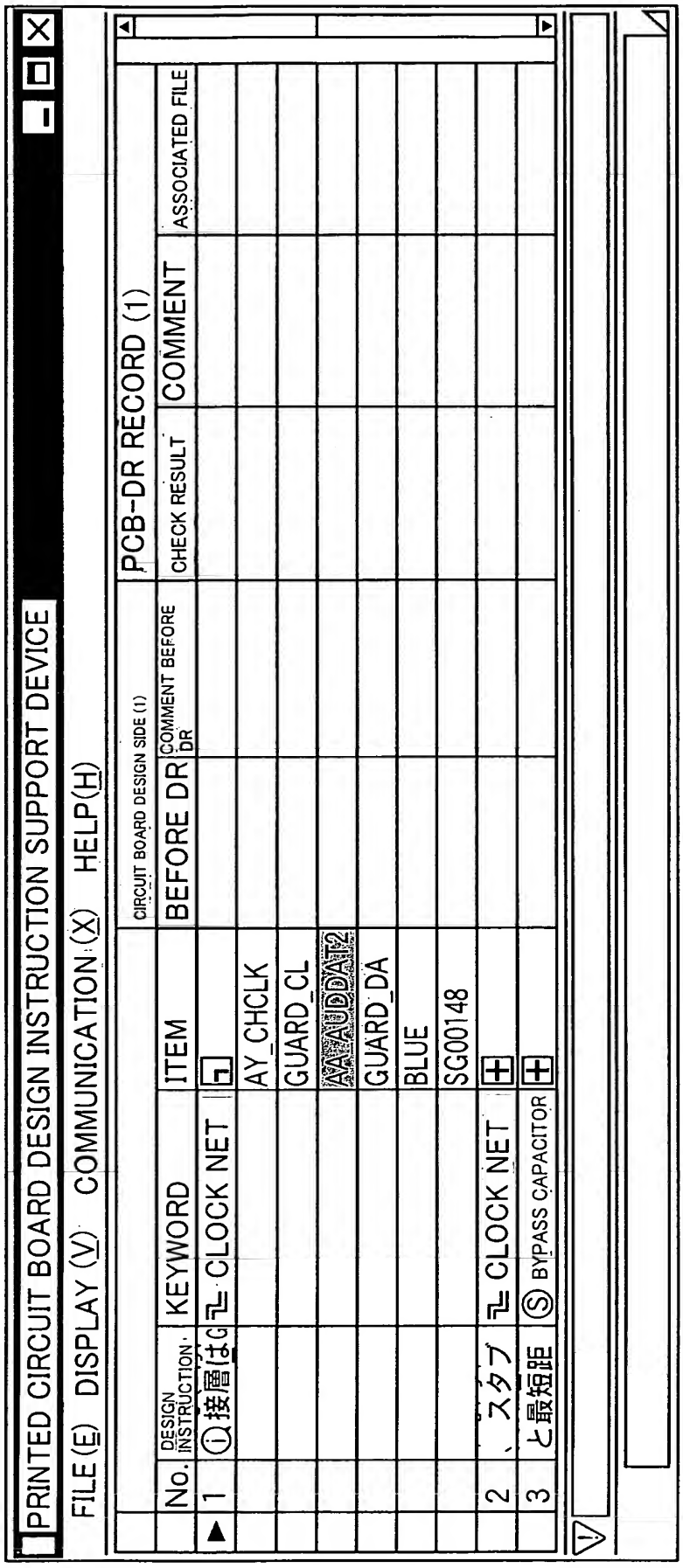

PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE
FILE(F) DISPLAY(V) COMMUNICATION(X) HELP(H)
CIRCUIT BOARD DESIGN SIDE (1)
PCB-DR RECORD (1)
No.
DESIGN INSTRUCTION
KEYWORD
ITEM
BEFORE DR
COMMENT BEFORE DR
CHECK RESULT
COMMENT
ASSOCIATED FILE
1 ①接層はG CLOCK NET
AY_CHCLK
GUARD_CL
AAAADDAT2
GUARD_DA
BLUE
SG00148
2 、スタブ CLOCK NET
3 と最短距 BYPASS CAPACITOR

FIG. 3(a)

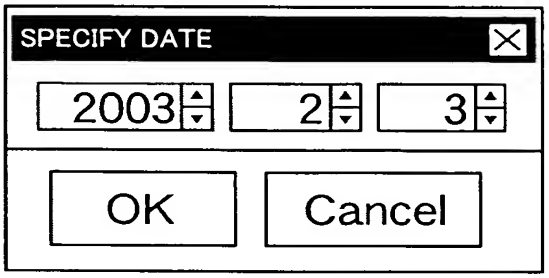


FIG. 3(b)

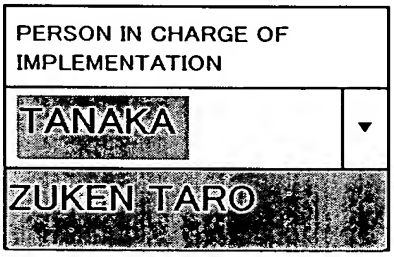


FIG. 3(c)

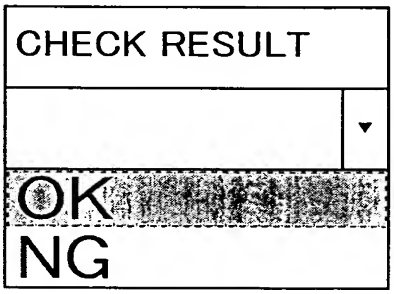
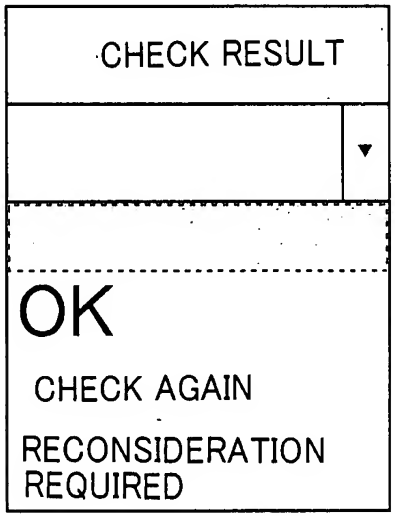


FIG. 4(a)

CHECK DATE	PERSON IN CHARGE OF CHECK	CHECK RESULT
2003/ 3/25	zuken	OK

FIG. 4(b)



App No.: 10/575,758 Docket No.: 1794-0182PUS1
Inventor: Hiromichi INAISHI et al.
Title: PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT METHOD AND DEVICE
REPLACEMENT SHEET

FIG. 5(a)

(a)

CHECK RESULT
OK:2/6
OK
CHECK AGAIN
OK

CHECK RESULT
RECONSIDERATION REQUIRED :3/6
RECONSIDERATION REQUIRED
RECONSIDERATION REQUIRED
RECONSIDERATION REQUIRED

FIG. 5(b)

(b)

ITEM	CHECK RESULT
AY_CHCLK	OK
GUARD_CL	CHECK AGAIN RECONSIDERATION REQUIRED
AA_AUDDAT2	
GUARD_DA	
BLUE	
SG00148	

ITEM	CHECK RESULT
	OK:6/6
AY_CHCLK	OK
GUARD_CL	OK
AA_AUDDAT2	OK
GUARD_DA	OK
BLUE	OK
SG00148	OK

App No.: 10/575,758 Docket No.: 1794-0182PUS1
Inventor: Hiromichi INAISHI et al.
Title: PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT METHOD AND DEVICE
REPLACEMENT SHEET

FIG. 6

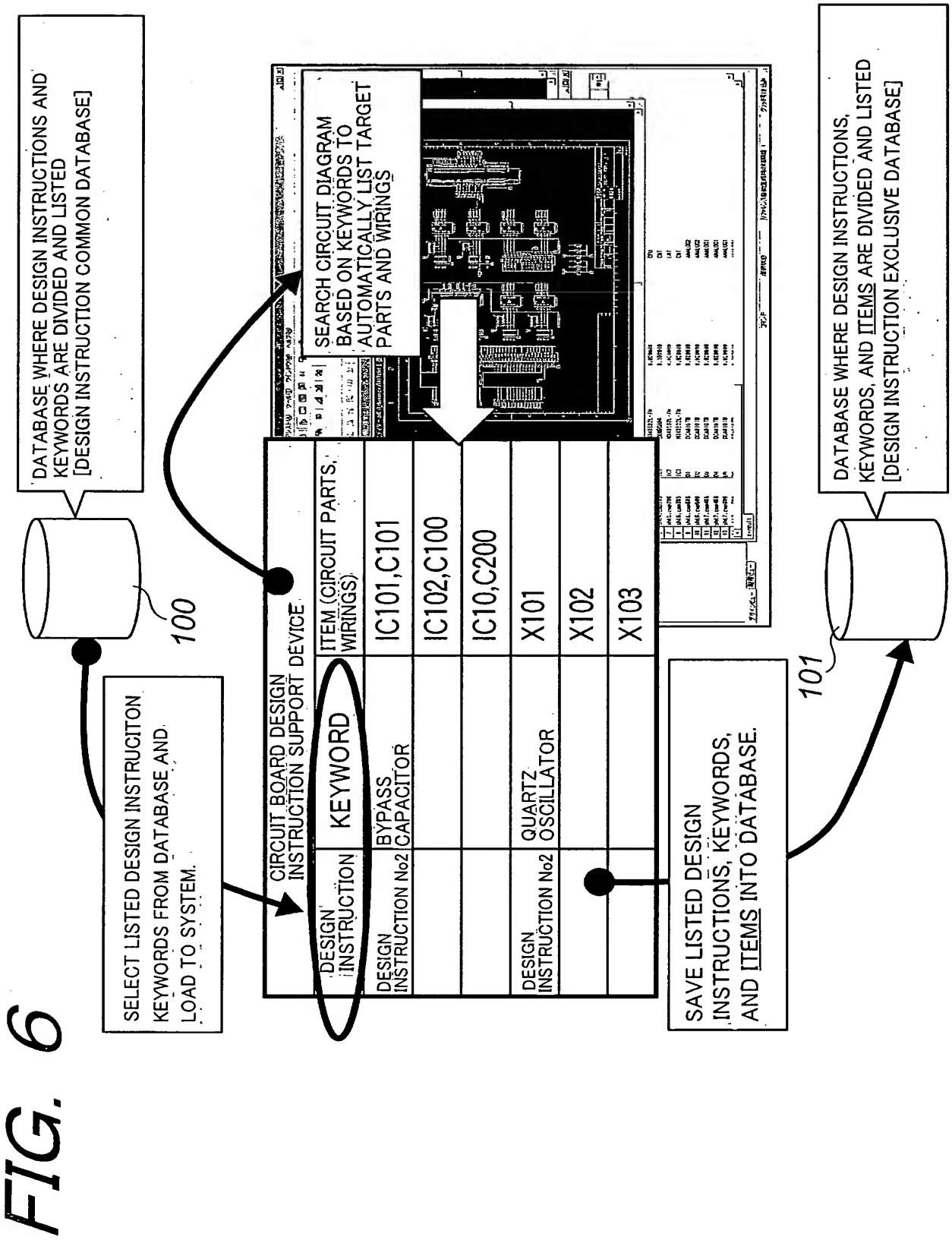

DATABASE WHERE DESIGN INSTRUCTIONS AND KEYWORDS ARE DIVIDED AND LISTED [DESIGN INSTRUCTION COMMON DATABASE]
100
SELECT LISTED DESIGN INSTRUCITON KEYWORDS FROM DATABASE AND LOAD TO SYSTEM.
CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE
DESIGN INSTRUCTION
KEYWORD
ITEM (CIRCUIT PARTS, WIRINGS)
DESIGN INSTRUCTION No2
BYPASS CAPACITOR
IC101,C101
IC102,C100
IC10,C200
DESIGN INSTRUCTION No2
QUARTZ OSCILLATOR
X101
X102
X103
SEARCH CIRCUIT DIAGRAM BASED ON KEYWORDS TO AUTOMATICALLY LIST TARGET PARTS AND WIRINGS
SAVE LISTED DESIGN INSTRUCTIONS, KEYWORDS, AND ITEMS INTO DATABASE.
101
DATABASE WHERE DESIGN INSTRUCTIONS, KEYWORDS, AND ITEMS ARE DIVIDED AND LISTED [DESIGN INSTRUCTION EXCLUSIVE DATABASE]

FIG. 7

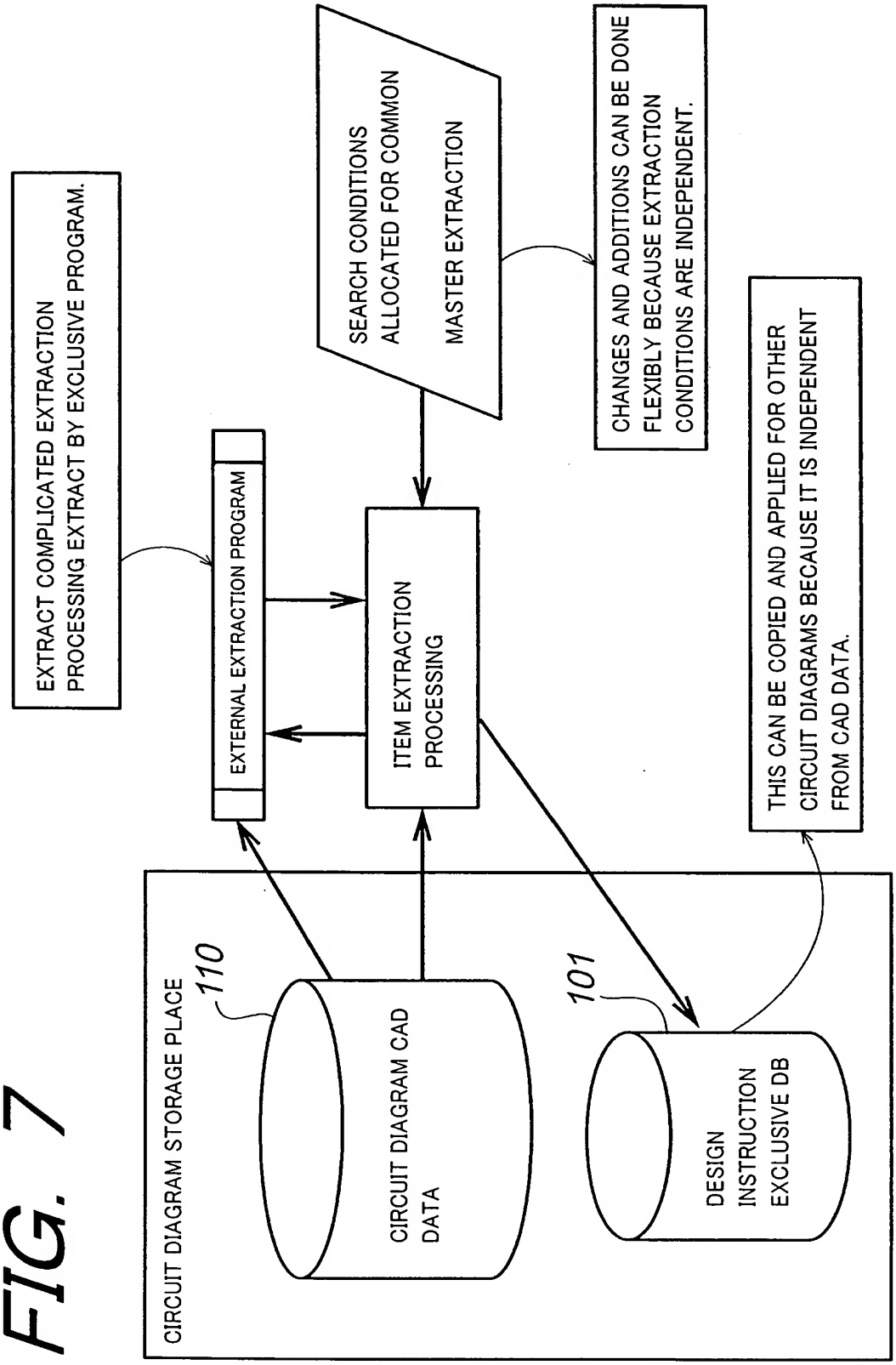

EXTRACT COMPLICATED EXTRACTION PROCESSING EXTRACT BY EXCLUSIVE PROGRAM.
EXTERNAL EXTRACTION PROGRAM
SEARCH CONDITIONS ALLOCATED FOR COMMON MASTER EXTRACTION
ITEM EXTRACTION PROCESSING
CHANGES AND ADDITIONS CAN BE DONE FLEXIBLY BECAUSE EXTRACTION CONDITIONS ARE INDEPENDENT.
THIS CAN BE COPIED AND APPLIED FOR OTHER CIRCUIT DIAGRAMS BECAUSE IT IS INDEPENDENT FROM CAD DATA.
CIRCUIT DIAGRAM STORAGE PLACE
110
CIRCUIT DIAGRAM CAD DATA
101
DESIGN INSTRUCTION EXCLUSIVE DB

FIG. 8

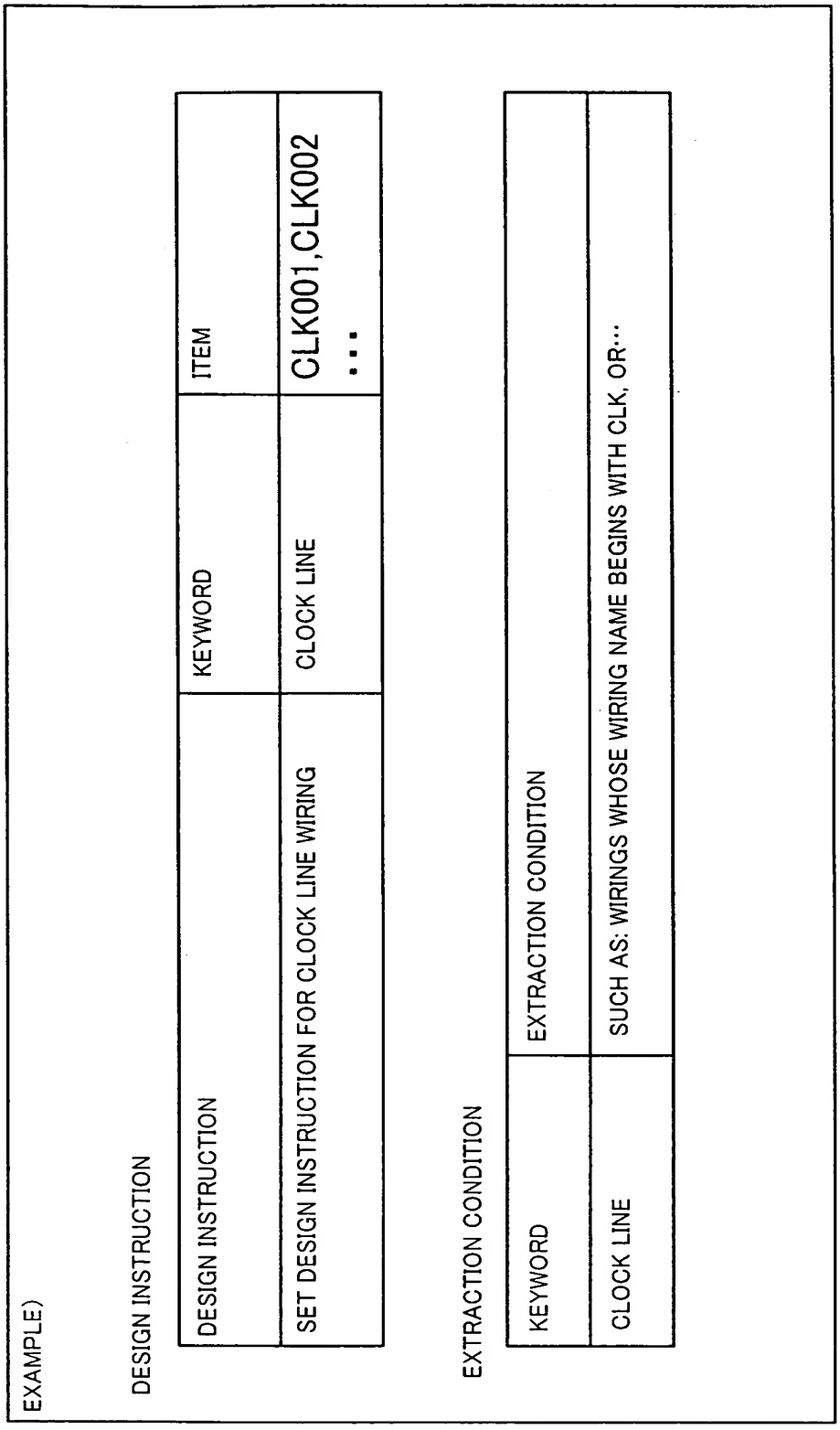

EXAMPLE)
DESIGN INSTRUCTION
DESIGN INSTRUCTION
KEYWORD
ITEM
SET DESIGN INSTRUCTION FOR CLOCK LINE WIRING
CLOCK LINE
CLK001,CLK002
...
EXTRACTION CONDITION
KEYWORD
EXTRACTION CONDITION
CLOCK LINE
SUCH AS: WIRINGS WHOSE WIRING NAME BEGINS WITH CLK, OR…

FIG. 9

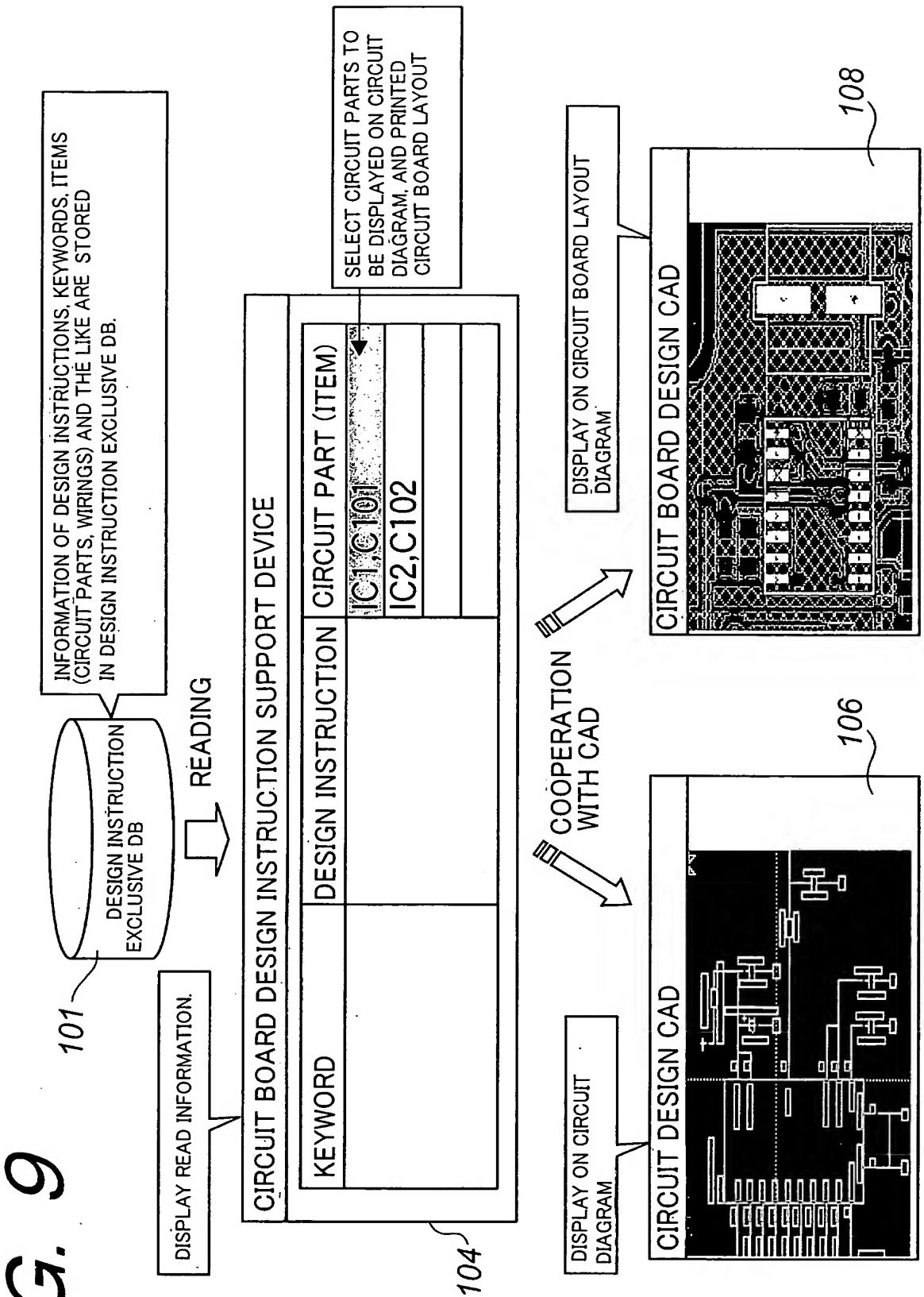

INFORMATION OF DESIGN INSTRUCTIONS, KEYWORDS, ITEMS (CIRCUIT PARTS, WIRINGS) AND THE LIKE ARE STORED IN DESIGN INSTRUCTION EXCLUSIVE DB.
DESIGN INSTRUCTION EXCLUSIVE DB
101
READING
DISPLAY READ INFORMATION.
CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE
KEYWORD
DESIGN INSTRUCTION
CIRCUIT PART (ITEM)
IC1,C101
IC2,C102
SELECT CIRCUIT PARTS TO BE DISPLAYED ON CIRCUIT DIAGRAM, AND PRINTED CIRCUIT BOARD LAYOUT
104
COOPERATION WITH CAD
DISPLAY ON CIRCUIT DIAGRAM
CIRCUIT DESIGN CAD
106
DISPLAY ON CIRCUIT BOARD LAYOUT DIAGRAM
CIRCUIT BOARD DESIGN CAD
108

FIG. 10

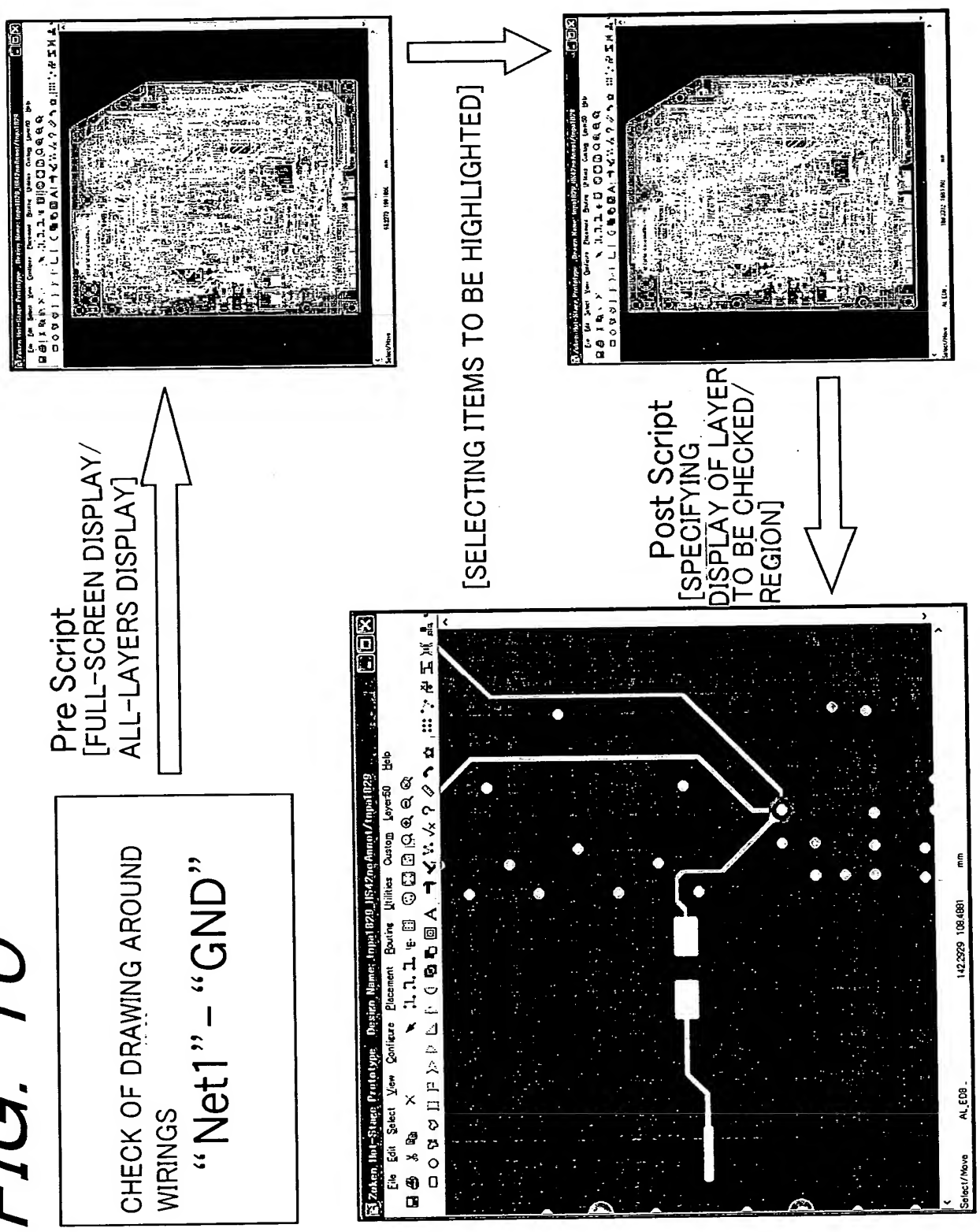

CHECK OF DRAWING AROUND WIRINGS
"Net1" – "GND"
Pre Script
[FULL-SCREEN DISPLAY/
ALL-LAYERS DISPLAY]
[SELECTING ITEMS TO BE HIGHLIGHTED]
Post Script
[SPECIFYING
DISPLAY OF LAYER
TO BE CHECKED/
REGION]

FIG. 11 (a)

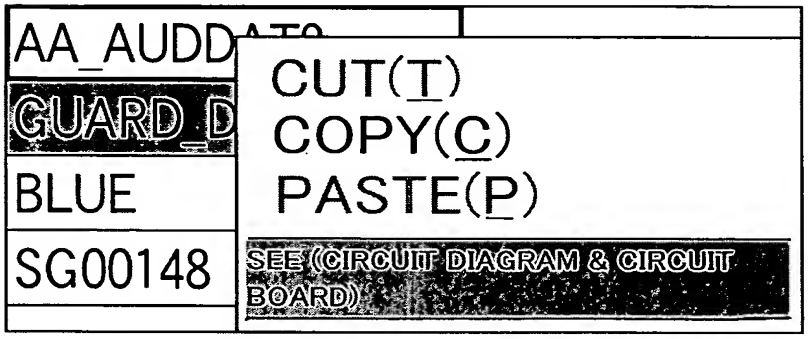


FIG. 11 (b)

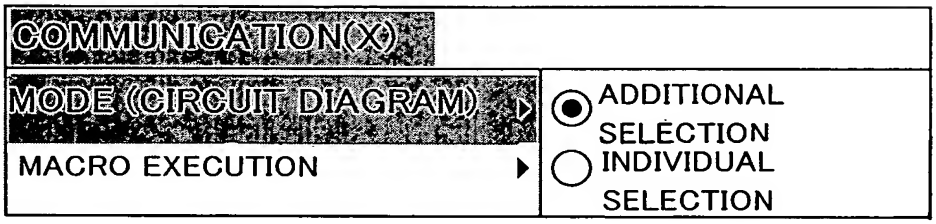


FIG. 11 (c)

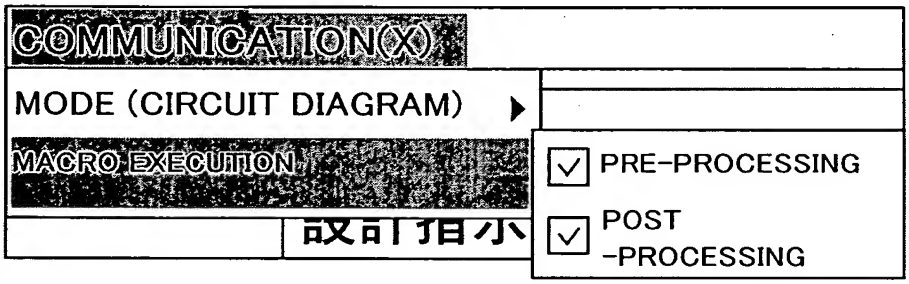


FIG. 12

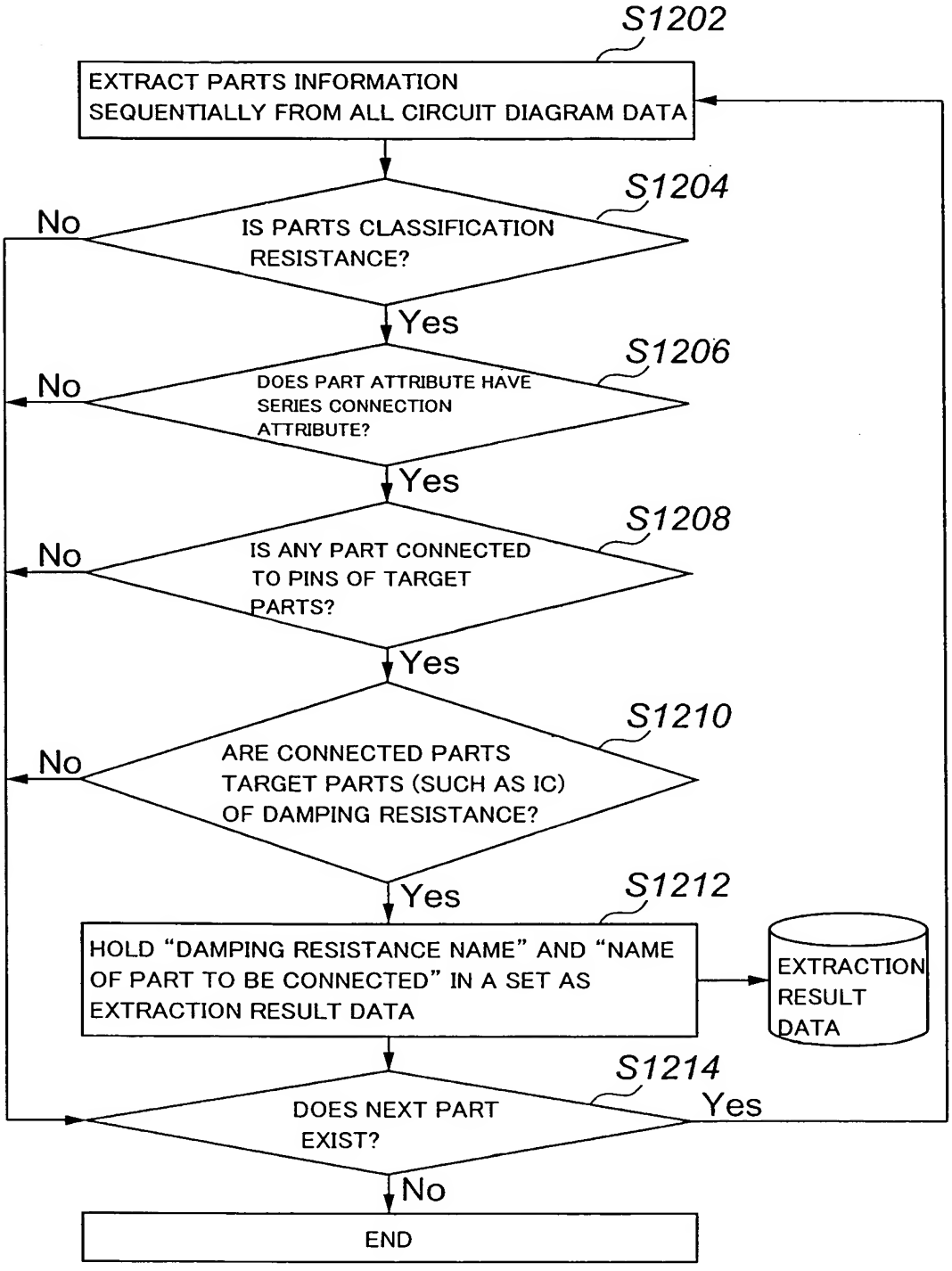

S1202
EXTRACT PARTS INFORMATION SEQUENTIALLY FROM ALL CIRCUIT DIAGRAM DATA
S1204
IS PARTS CLASSIFICATION RESISTANCE?
No
Yes
S1206
DOES PART ATTRIBUTE HAVE SERIES CONNECTION ATTRIBUTE?
No
Yes
S1208
IS ANY PART CONNECTED TO PINS OF TARGET PARTS?
No
Yes
S1210
ARE CONNECTED PARTS TARGET PARTS (SUCH AS IC) OF DAMPING RESISTANCE?
No
Yes
S1212
HOLD "DAMPING RESISTANCE NAME" AND "NAME OF PART TO BE CONNECTED" IN A SET AS EXTRACTION RESULT DATA
EXTRACTION RESULT DATA
S1214
DOES NEXT PART EXIST?
Yes
No
END

FIG. 13

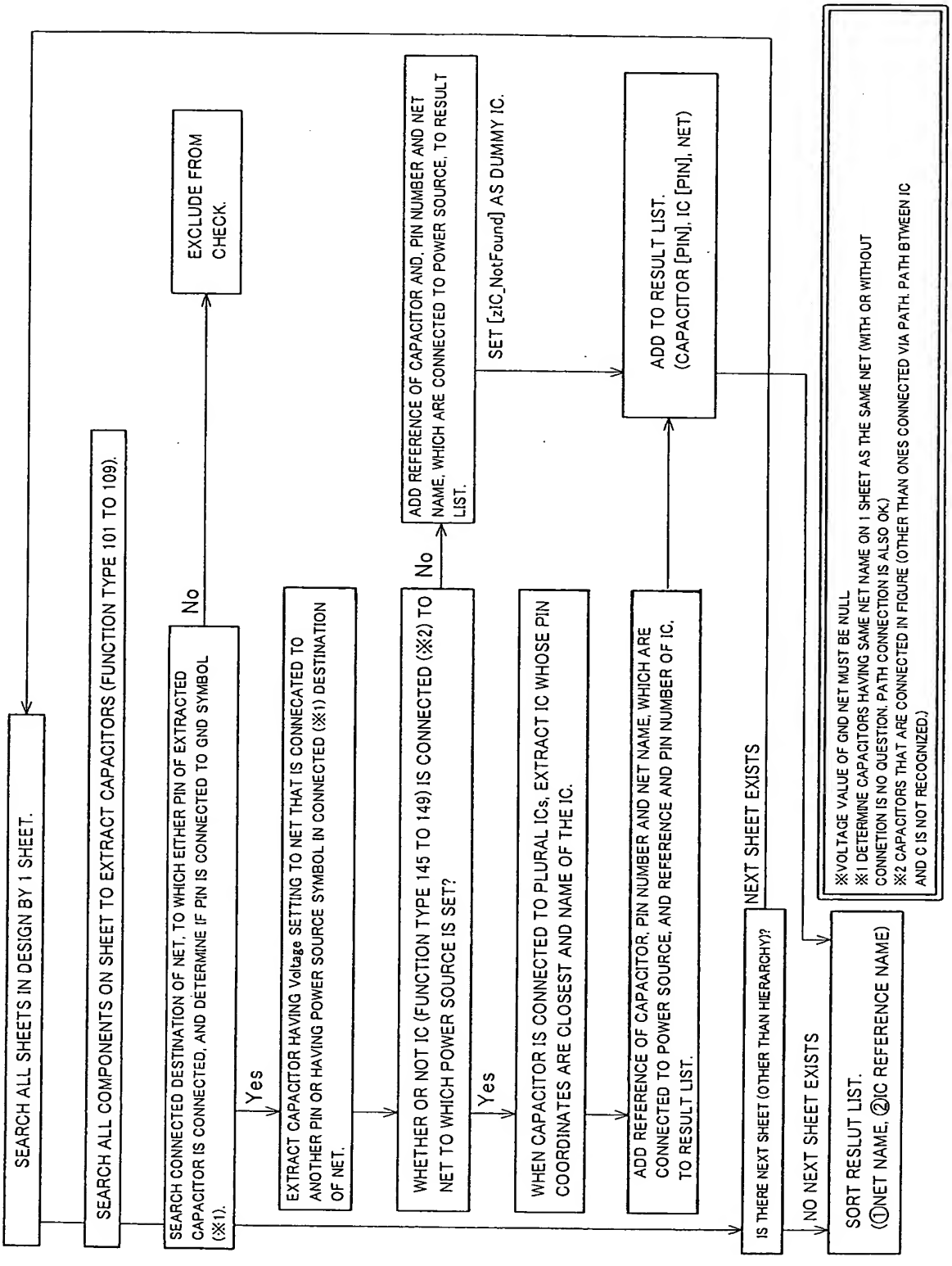

SEARCH ALL SHEETS IN DESIGN BY 1 SHEET.
SEARCH ALL COMPONENTS ON SHEET TO EXTRACT CAPACITORS (FUNCTION TYPE 101 TO 109).
SEARCH CONNECTED DESTINATION OF NET, TO WHICH EITHER PIN OF EXTRACTED CAPACITOR IS CONNECTED, AND DETERMINE IF PIN IS CONNECTED TO GND SYMBOL (※1).
No
EXCLUDE FROM CHECK.
Yes
EXTRACT CAPACITOR HAVING Voltage SETTING TO NET THAT IS CONNECATED TO ANOTHER PIN OR HAVING POWER SOURCE SYMBOL IN CONNECTED (※1) DESTINATION OF NET.
WHETHER OR NOT IC (FUNCTION TYPE 145 TO 149) IS CONNECTED (※2) TO NET TO WHICH POWER SOURCE IS SET?
No
ADD REFERENCE OF CAPACITOR AND, PIN NUMBER AND NET NAME, WHICH ARE CONNECTED TO POWER SOURCE, TO RESULT LIST.
SET [zIC_NotFound] AS DUMMY IC.
Yes
WHEN CAPACITOR IS CONNECTED TO PLURAL ICs, EXTRACT IC WHOSE PIN COORDINATES ARE CLOSEST AND NAME OF THE IC.
ADD REFERENCE OF CAPACITOR, PIN NUMBER AND NET NAME, WHICH ARE CONNECTED TO POWER SOURCE, AND REFERENCE AND PIN NUMBER OF IC, TO RESULT LIST.
ADD TO RESULT LIST.
(CAPACITOR [PIN], IC [PIN], NET)
IS THERE NEXT SHEET (OTHER THAN HIERARCHY)?
NEXT SHEET EXISTS
NO NEXT SHEET EXISTS
SORT RESLUT LIST.
(①NET NAME, ②IC REFERENCE NAME)
※VOLTAGE VALUE OF GND NET MUST BE NULL
※1 DETERMINE CAPACITORS HAVING SAME NET NAME ON 1 SHEET AS THE SAME NET (WITH OR WITHOUT CONNETION IS NO QUESTION. PATH CONNECTION IS ALSO OK.)
※2 CAPACITORS THAT ARE CONNECTED IN FIGURE (OTHER THAN ONES CONNECTED VIA PATH. PATH BTWEEN IC AND C IS NOT RECOGNIZED.)

FIG. 14

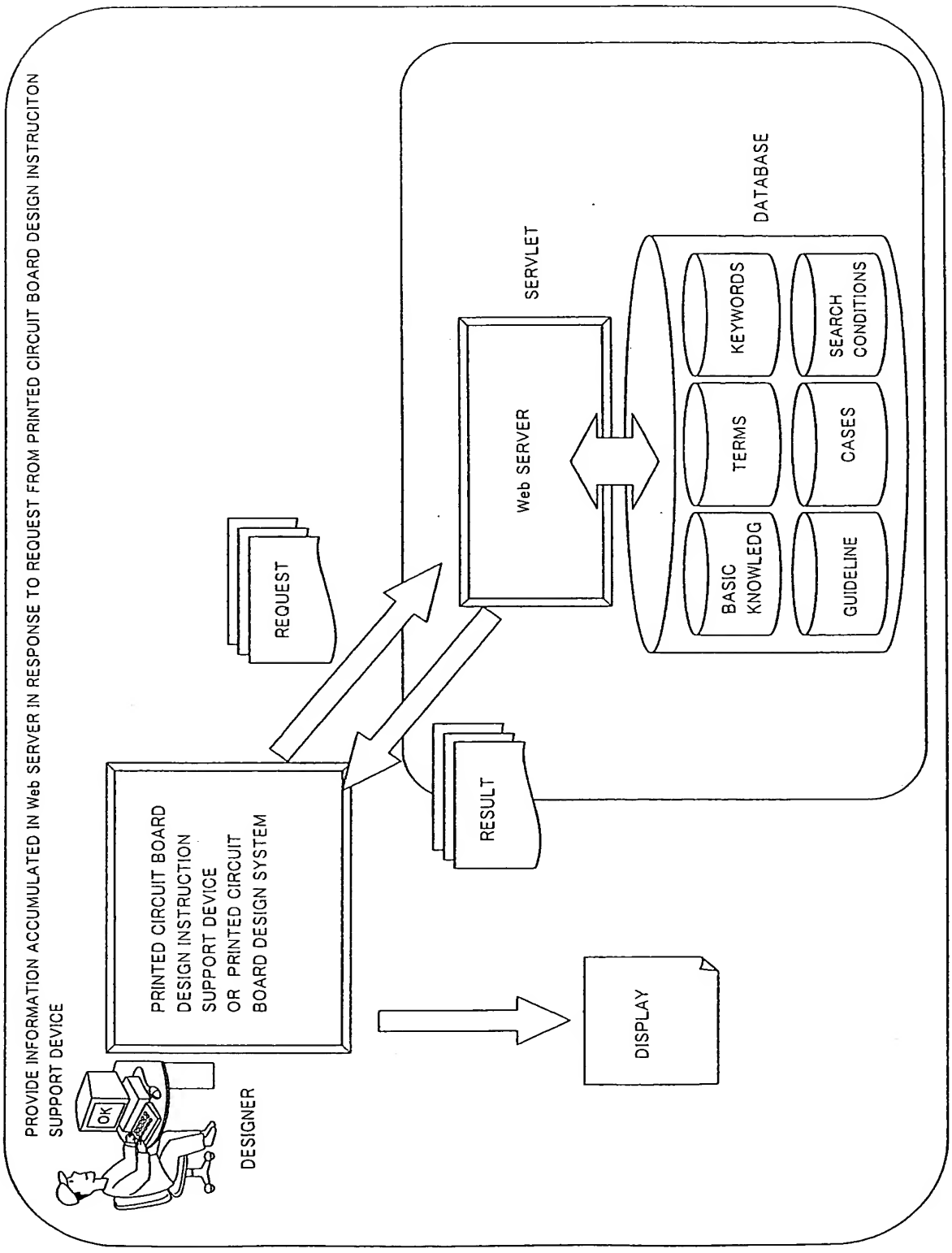

PROVIDE INFORMATION ACCUMULATED IN Web SERVER IN RESPONSE TO REQUEST FROM PRINTED CIRCUIT BOARD DESIGN INSTRUCITON SUPPORT DEVICE
DESIGNER
PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BOARD DESIGN SYSTEM
REQUEST
RESULT
DISPLAY
SERVLET
Web SERVER
DATABASE
KEYWORDS
SEARCH CONDITIONS
TERMS
CASES
BASIC KNOWLEDG
GUIDELINE

FIG. 15

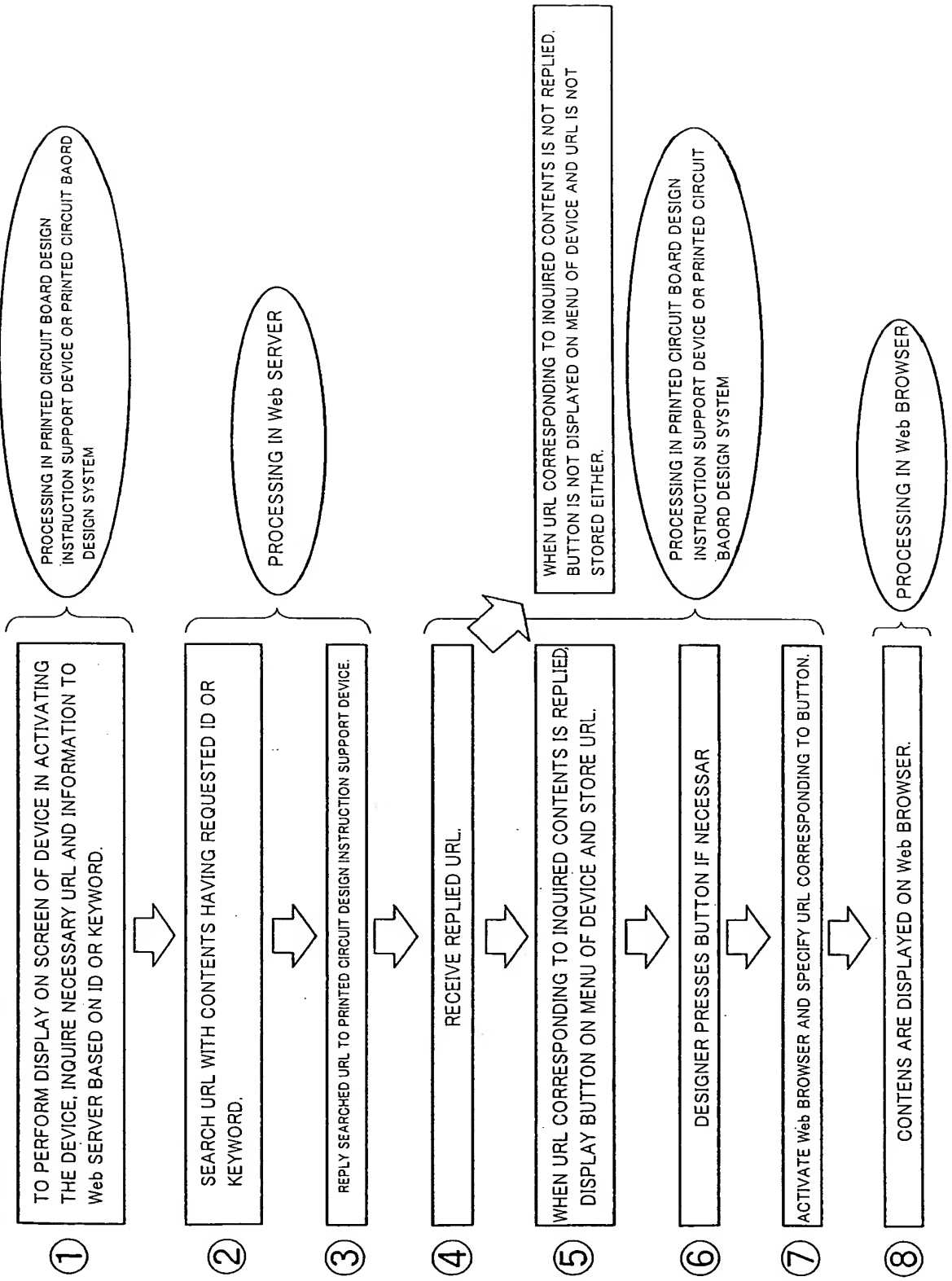

PROCESSING IN PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BAORD DESIGN SYSTEM
PROCESSING IN Web SERVER
WHEN URL CORRESPONDING TO INQUIRED CONTENTS IS NOT REPLIED. BUTTON IS NOT DISPLAYED ON MENU OF DEVICE AND URL IS NOT STORED EITHER.
PROCESSING IN PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BAORD DESIGN SYSTEM
PROCESSING IN Web BROWSER
① TO PERFORM DISPLAY ON SCREEN OF DEVICE IN ACTIVATING THE DEVICE, INQUIRE NECESSARY URL AND INFORMATION TO Web SERVER BASED ON ID OR KEYWORD.
② SEARCH URL WITH CONTENTS HAVING REQUESTED ID OR KEYWORD.
③ REPLY SEARCHED URL TO PRINTED CIRCUIT DESIGN INSTRUCTION SUPPORT DEVICE.
④ RECEIVE REPLIED URL.
⑤ WHEN URL CORRESPONDING TO INQUIRED CONTENTS IS REPLIED, DISPLAY BUTTON ON MENU OF DEVICE AND STORE URL.
⑥ DESIGNER PRESSES BUTTON IF NECESSAR
⑦ ACTIVATE Web BROWSER AND SPECIFY URL CORRESPONDING TO BUTTON.
⑧ CONTENS ARE DISPLAYED ON Web BROWSER.

FIG. 16

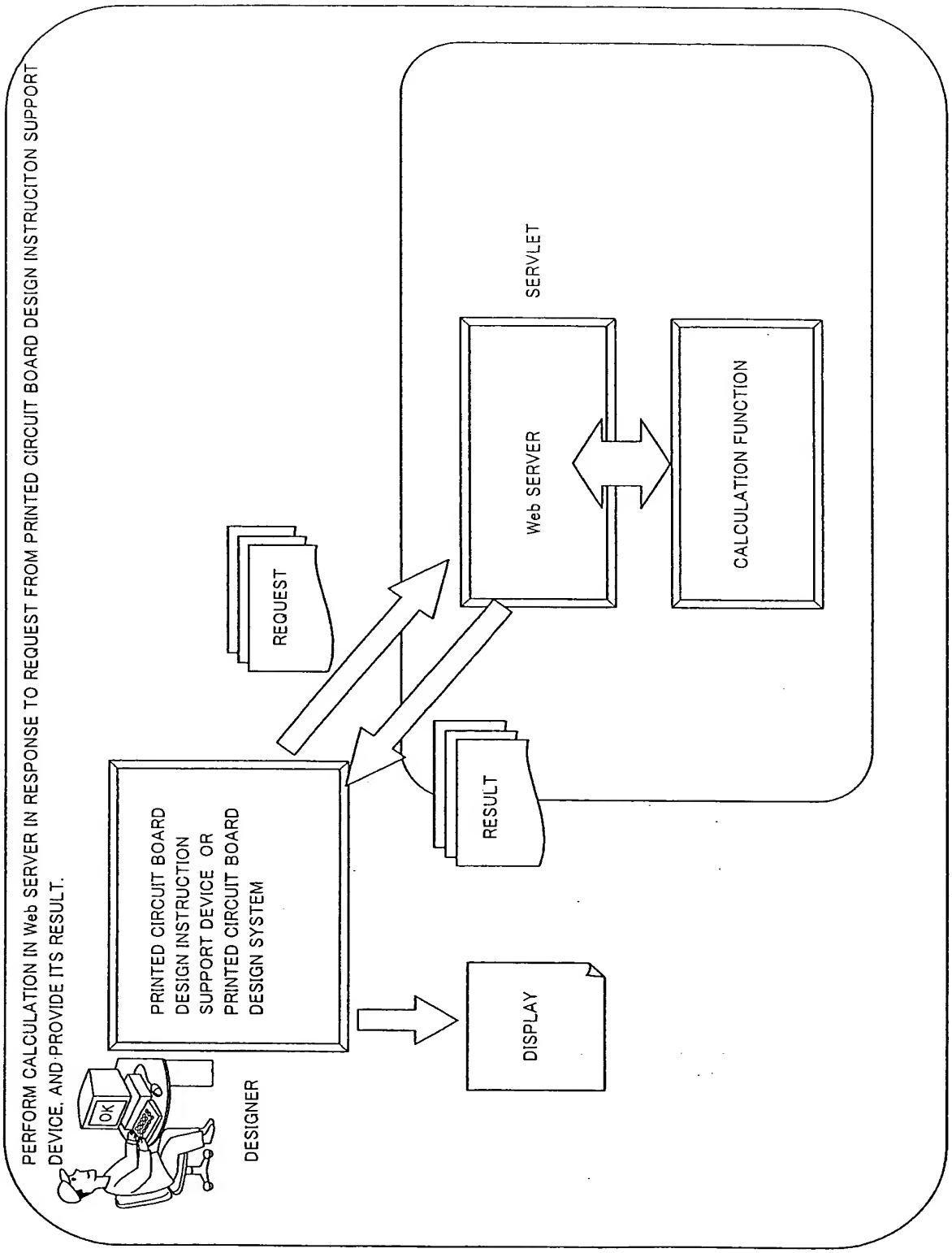

PERFORM CALCULATION IN Web SERVER IN RESPONSE TO REQUEST FROM PRINTED CIRCUIT BOARD DESIGN INSTRUCITON SUPPORT DEVICE, AND PROVIDE ITS RESULT.
SERVLET
Web SERVER
CALCULATION FUNCTION
REQUEST
RESULT
PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BOARD DESIGN SYSTEM
DISPLAY
DESIGNER
OK

FIG. 17

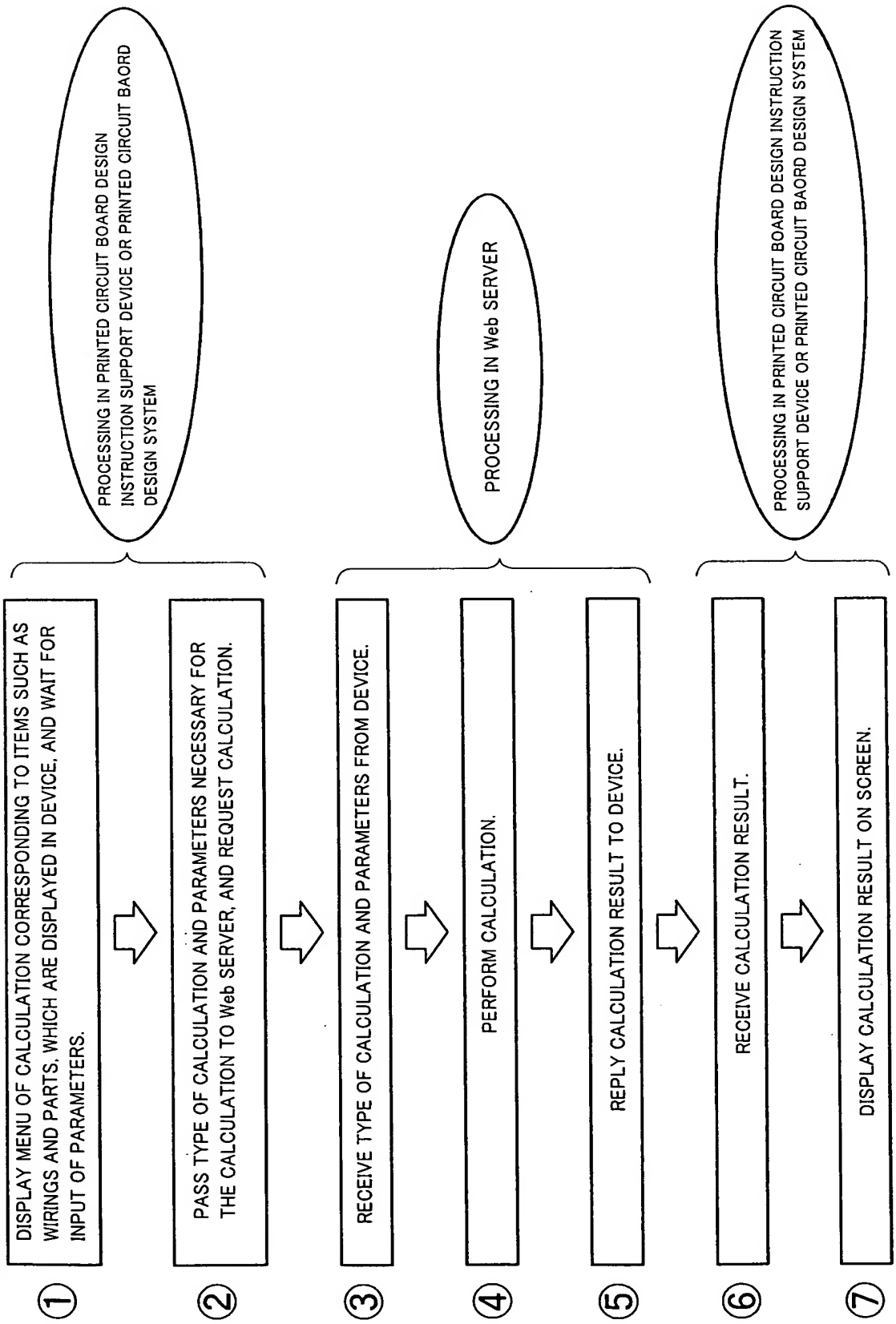

PROCESSING IN PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BAORD DESIGN SYSTEM
PROCESSING IN Web SERVER
PROCESSING IN PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BAORD DESIGN SYSTEM
① DISPLAY MENU OF CALCULATION CORRESPONDING TO ITEMS SUCH AS WIRINGS AND PARTS, WHICH ARE DISPLAYED IN DEVICE, AND WAIT FOR INPUT OF PARAMETERS.
② PASS TYPE OF CALCULATION AND PARAMETERS NECESSARY FOR THE CALCULATION TO Web SERVER, AND REQUEST CALCULATION.
③ RECEIVE TYPE OF CALCULATION AND PARAMETERS FROM DEVICE.
④ PERFORM CALCULATION.
⑤ REPLY CALCULATION RESULT TO DEVICE.
⑥ RECEIVE CALCULATION RESULT.
⑦ DISPLAY CALCULATION RESULT ON SCREEN.

FIG. 18

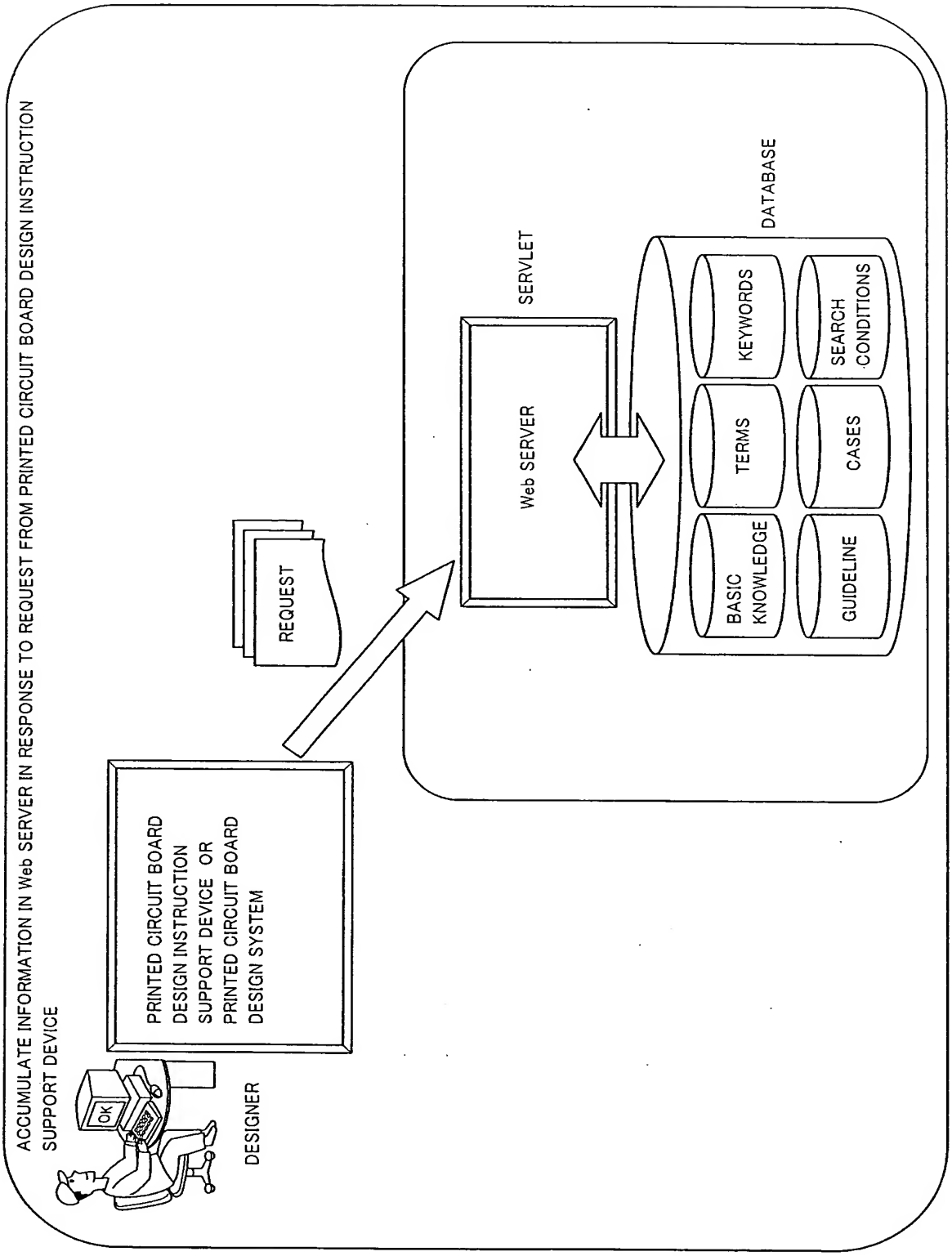
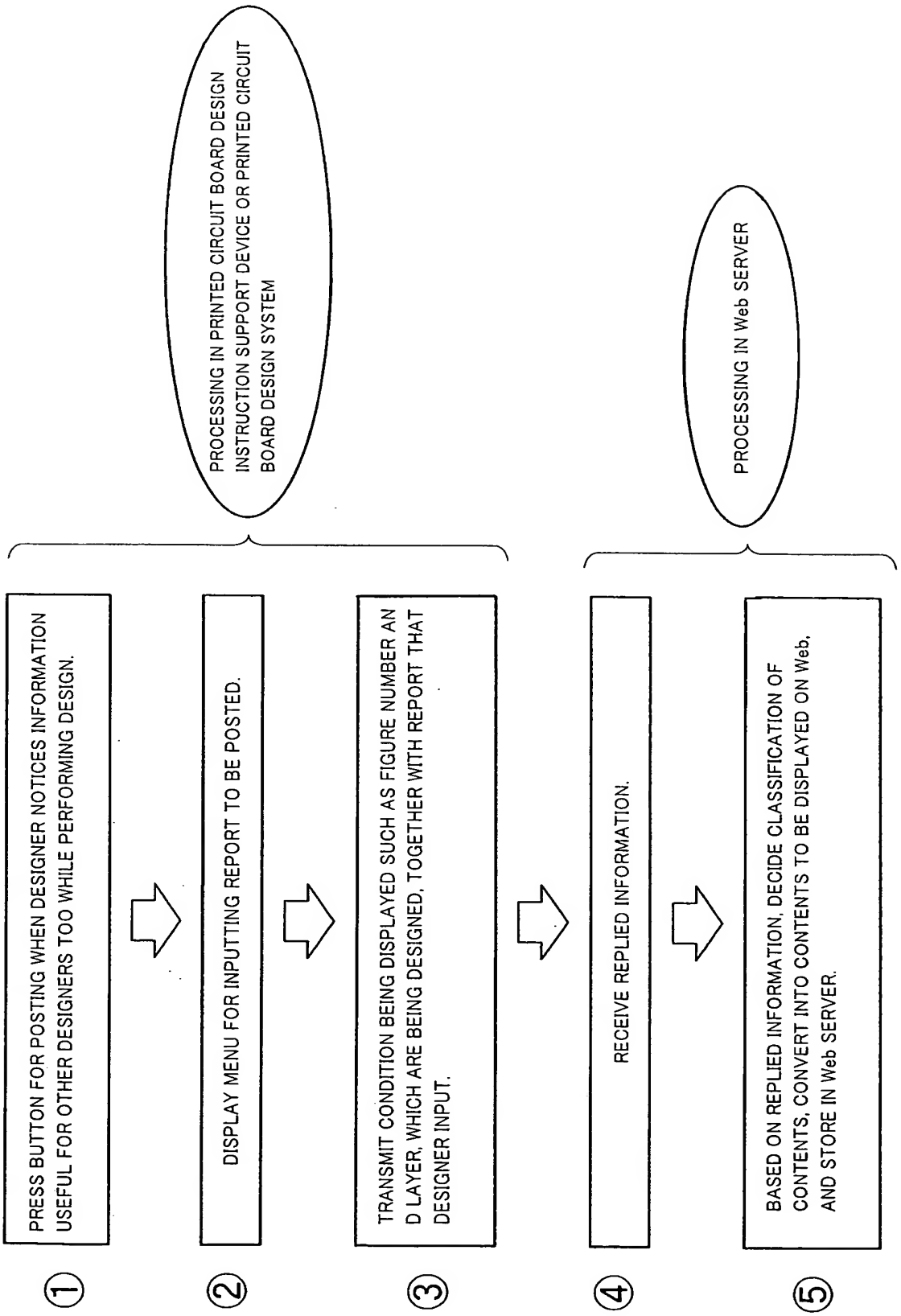

ACCUMULATE INFORMATION IN Web SERVER IN RESPONSE TO REQUEST FROM PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE
DESIGNER
PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BOARD DESIGN SYSTEM
REQUEST
SERVLET
Web SERVER
DATABASE
KEYWORDS
SEARCH CONDITIONS
TERMS
CASES
BASIC KNOWLEDGE
GUIDELINE

FIG. 19


PROCESSING IN PRINTED CIRCUIT BOARD DESIGN INSTRUCTION SUPPORT DEVICE OR PRINTED CIRCUIT BOARD DESIGN SYSTEM
PROCESSING IN Web SERVER
① PRESS BUTTON FOR POSTING WHEN DESIGNER NOTICES INFORMATION USEFUL FOR OTHER DESIGNERS TOO WHILE PERFORMING DESIGN.
② DISPLAY MENU FOR INPUTTING REPORT TO BE POSTED.
③ TRANSMIT CONDITION BEING DISPLAYED SUCH AS FIGURE NUMBER AND LAYER, WHICH ARE BEING DESIGNED, TOGETHER WITH REPORT THAT DESIGNER INPUT.
④ RECEIVE REPLIED INFORMATION.
⑤ BASED ON REPLIED INFORMATION, DECIDE CLASSIFICATION OF CONTENTS, CONVERT INTO CONTENTS TO BE DISPLAYED ON Web, AND STORE IN Web SERVER.